# NX-series Pulse Output Unit

# NX-PG0□□□

CSM_NX-PG0____DS_E_4_1

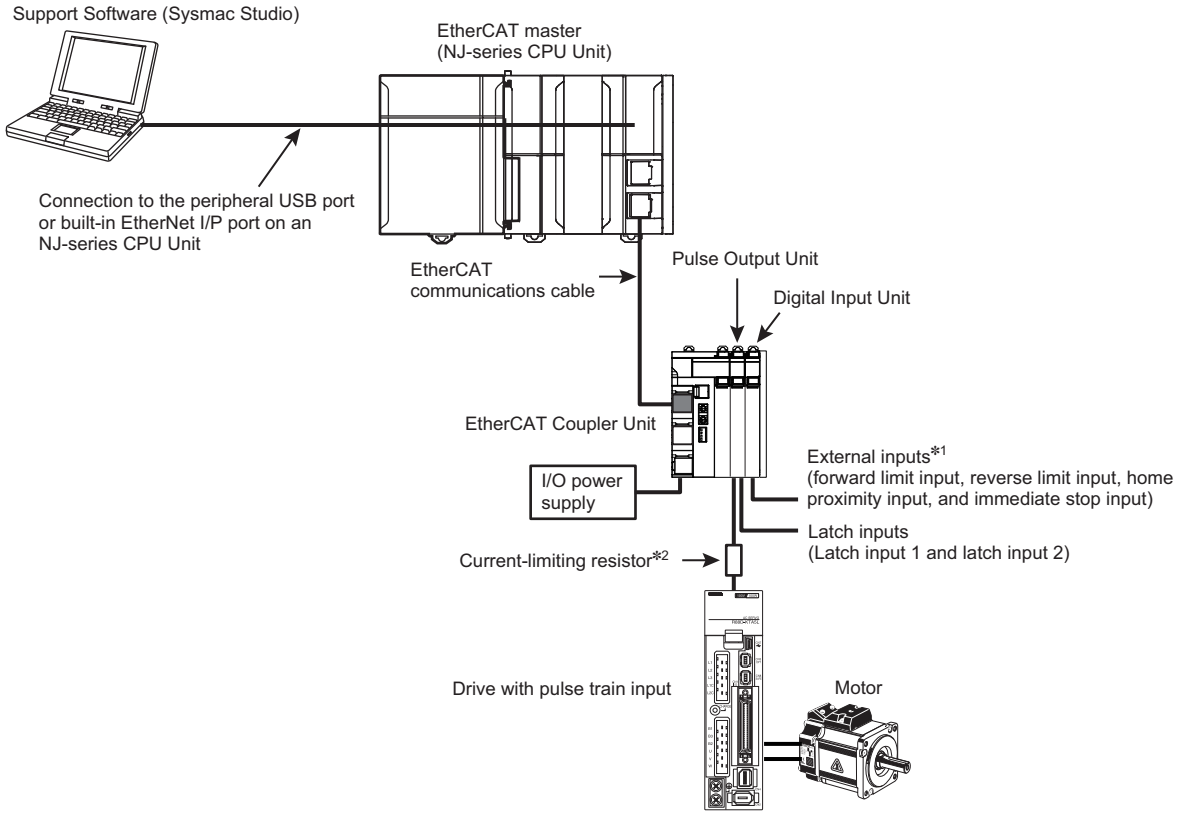
## Positioning with Pulse Input Type Motor Drivers Such As Stepper Motor Drive

- The MC Function Modules of the NJ-series Machine Automation Controller enable pulse outputs for motor control.
- The same motion control instructions as those for Servomotor control allow you to program single-axis PTP control and interpolation.

## Features

- When the motion control instructions of the MC Function Modules of the NJ-series Machine Automation Controller are used, number of usable units is the same as the maximum number of axes controlled by the NJ-series Controller.
- Synchronous I/O refreshing with the EtherCAT Coupler Unit.
- Latch function (2 external latch inputs)
- Maximum pulse output speed: 500 kpps

## System Configuration




*1. When the Unit is connected to an NJ-series CPU, you can use these inputs by adding a Digital Input Unit and assigning MC Function Module functions.

*2. The pulse output from a Pulse Output Unit is a 24-VDC PNP open collector output. Connect an external current-limiting resistor according to the input specifications of the connected motor drive.
Example: For a G5-series Servo Drive, connect a 2-kΩ (1/2-W) resistor in series.

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# Ordering Information

**International Standards**

- The standards are abbreviated as follows: U: UL, U1: UL(Class I Division 2 Products for Hazardous Locations), C: CSA, UC: cULus, UC1: cULus (Class I Division 2 Products for Hazardous Locations), CU: cUL, N: NK, L: Lloyd, CE: EC Directives, and KC: KC Registration.
- Contact your OMRON representative for further details and applicable conditions for these standards.

| Unit type | Product Name | Specification | | | | | | Model | Standards |
|---|---|---|---|---|---|---|---|---|---|
| | | Number of channels | External inputs | External outputs | Maximum pulse output speed | I/O refreshing method | Number of I/O entry mappings | | |
| **NX Series Position Interface Unit** | Pulse Output Units | 1 (NPN) | 2 (NPN) | 1 (NPN) | 500 kpps | Synchronous I/O refreshing | 1/1 | **NX-PG0112** | UC1, CE, KC |
| | | 1 (PNP) | 2 (PNP) | 1 (PNP) | | | | **NX-PG0122** | UC1, N, L, CE, KC |

## Option

| Product Name | Specification | Model | Standards |
|---|---|---|---|
| **Unit/Terminal Block Coding Pins** | For 10 Units<br>(Terminal Block: 30 pins, Unit: 30 pins) | **NX-AUX02** | – |

| Product Name | Specification | | | | Model | Standards |
|---|---|---|---|---|---|---|
| | No. of terminals | Terminal number indications | Ground terminal mark | Terminal current capacity | | |
| **Terminal Block** | 16 | A/B | None | 10 A | **NX-TBA162** | – |

## Accessories

Not included.

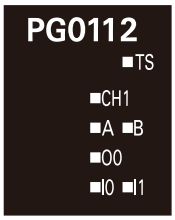
# General Specification

| Item | | Specification |
|---|---|---|
| **Enclosure** | | Mounted in a panel |
| **Grounding method** | | Ground to less than 100 Ω or less |
| **Operating environment** | **Ambient operating temperature** | 0 to 55°C |
| | **Ambient operating humidity** | 10% to 95% (with no condensation or icing) |
| | **Atmosphere** | Must be free from corrosive gases. |
| | **Ambient storage temperature** | –25 to 70°C (with no condensation or icing) |
| | **Altitude** | 2,000 m max. |
| | **Pollution degree** | Pollution degree 2 or less: Conforms to JIS B3502 and IEC 61131-2. |
| | **Noise immunity** | Conforms to IEC61000-4-4, 2 kV (power supply line) |
| | **Overvoltage category** | Category II: Conforms to JIS B3502 and IEC 61131-2. |
| | **EMC immunity level** | Zone B |
| | **Vibration resistance** | Conforms to IEC 60068-2-6.<br>5 to 8.4 Hz with 3.5-mm amplitude, 8.4 to 150 Hz, acceleration of 9.8 $m/s^2$, 100 min each in X, Y, and Z directions (10 sweeps of 10 min each = 100 min total) |
| | **Shock resistance** | Conforms to IEC 60068-2-27. 147 $m/s^2$, 3 times each in X, Y, and Z directions |
| **Applicable standards** | | cULus: Listed UL508 and ANSI/ISA 12.12.01<br>EC: EN 61131-2 and C-Tick, KC Registration, NK, LR |

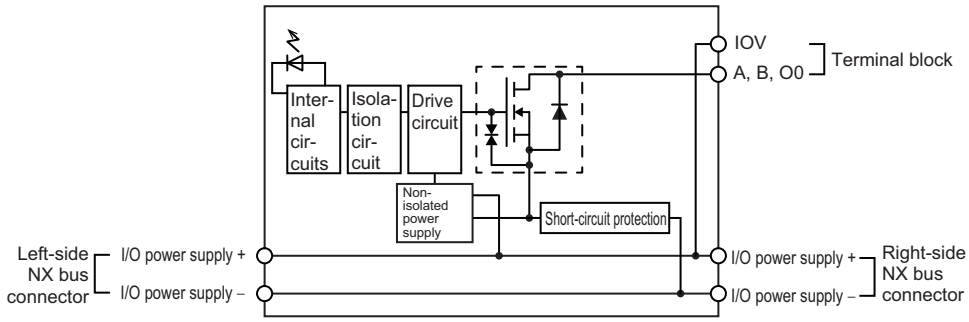
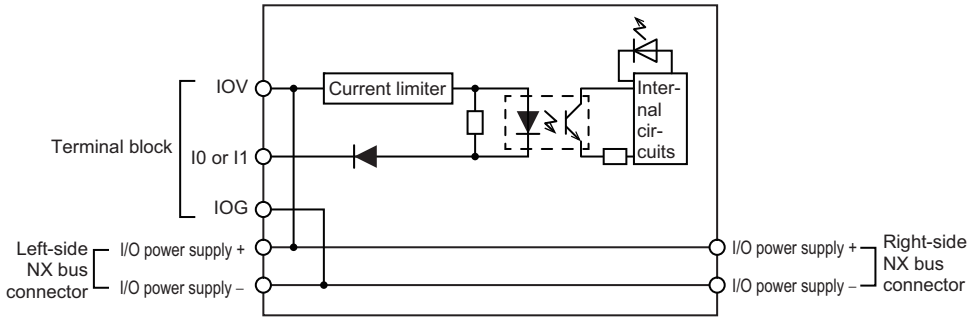
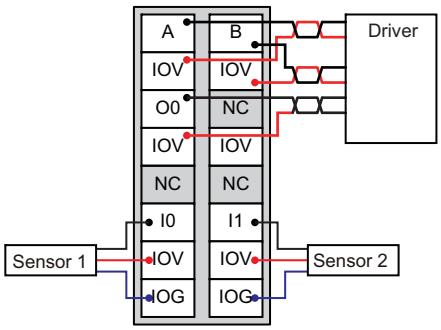
# Specification

## ● Pulse Output Units

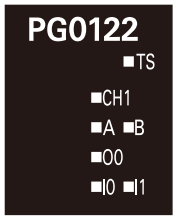
## NX-PG0112

| | | | |
|---|---|---|---|
| **Unit name** | Pulse Output Units | **Model** | NX-PG0112 |
| **Number of axes** | 1 | **Type of external connections** | Screwless clamping terminal block (16 terminals) |
| **I/O refreshing method** | Synchronous I/O refreshing *1 | | |
| **Indicators** |  | **I/O signals** | Inputs: 2, External inputs<br>Outputs: 3, The outputs are the forward direction pulse output, reverse direction pulse output, and external output (one of each output). |
| **Control method** | Open-loop control through pulse string output | | |
| **Controlled drive** | Servo drive with a pulse string input or a stepper motor drive | | |
| **Pulse output form** | Open collector output | | |
| **Unit of control** | Pulses | | |
| **Maximum pulse output speed** | 500 kpps | | |
| **Pulse output method** | Forward/reverse direction outputs or Pulse + direction outputs | | |
| **Position control range** | –2,147,483,648 to 2,147,483,647 pulses | | |
| **Velocity control range** | 1 to 500,000 pps | | |
| **Positioning** *2 | | | |
| **Single-axis position control** | Absolute positioning, relative positioning, and interrupt feeding | | |
| **Single-axis velocity control** | Velocity control (velocity feeding in Position Control Mode) | | |
| **Single-axis synchronized control** | Cam operation and gear operation | | |
| **Single-axis manual operation** | Jogging | | |
| **Auxiliary function for single-axis control** | Homing, stopping, and override changes | | |
| **External input specifications** | | | |
| **Input voltage** | 20.4 to 28.8 VDC (24 VDC +20%/–15%) | **ON voltage/ON current** | 15 VDC min./3 mA min. |
| **Input current** | 4.6 mA typical (24 VDC) | **OFF voltage/OFF current** | 4.0 VDC max./1 mA max. |
| **ON/OFF response time** | 1 μs max./2 μs max. | | |
| **Internal I/O common processing** | NPN | | |
| **Pulse output and external output specifications** | | | |
| **Rated voltage** | 24 VDC | | |
| **Load voltage range** | 15 to 28.8 VDC | **Residual voltage** | 1.0 V max. |
| **Maximum load current** | 30 mA | **Leakage current** | 0.1 mA max. |
| **ON/OFF response time** | Pulse output: Refer to "*NX-series Position Interface Units User's Manual* (W524-E1)".<br>External output: 5 μs max./5 μs max. | | |
| **Internal I/O common processing** | NPN | | |
| **Dimensions** | 12 × 100 × 71 mm (W×H×D) | **Isolation method** | External inputs: Photocoupler isolation<br>External outputs: Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max. |
| **I/O power supply method** | Supplied from the NX bus.<br>20.4 to 28.8 VDC (24 VDC +20%, –15%) | **Current capacity of I/O power supply terminals** | IOV: 0.1 A max. per terminal<br>IOG: 0.1 A max. per terminal |
| **NX Unit power consumption** | 0.80 W max. | **Current consumption from I/O power supply** | 20 mA max. |
| **Weight** | 70 g max. | **Cable length** | 3 m max. |

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
*2. These functions are supported when you also use the MC Function Module in the NJ-series CPU Unit.
Refer to the NJ-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
Target position calculations (distribution calculations) for acceleration/deceleration control or for each control period must be performed on the Controller that is connected as the host.

| | |
|---|---|
| **Circuit layout** | Pulse Output and External Output<br>  <br>External Inputs<br>  |
| **Installation orientation and restrictions** | Installation orientation: 6 possible orientations<br>Restrictions: There are no restrictions. |
| **Terminal connection diagram** |  |
| **Failure detection** | None **Protection** None |

## NX-PG0122

| | | | |
|---|---|---|---|
| **Unit name** | Pulse Output Units | **Model** | NX-PG0122 |
| **Number of axes** | 1 | **Type of external connections** | Screwless push-in terminal block (16 terminals) |
| **I/O refreshing method** | Synchronous I/O refreshing *1 | | |
| **Indicators** |  | **I/O signals** | External inputs: 2<br>These are general-purpose inputs.<br>External outputs: 3<br>These are the forward direction pulse output, reverse direction pulse output, and a general-purpose output. |
| **Control method** | Open-loop control through pulse string output | | |
| **Controlled drive** | Servo drive with a pulse train input or a stepper motor drive | | |
| **Pulse output form** | Open collector output | | |
| **Control unit** | Pulses | | |
| **Maximum pulse output speed** | 500 kpps | | |
| **Pulse output method** | Forward/reverse direction pulse outputs or pulse + direction outputs | | |
| **Position control range** | –2,147,483,648 to 2,147,483,647 pulses | | |
| **Velocity control range** | 1 to 500,000 pps | | |
| **Positioning** *2 | | | |
| **Single-axis position control** | Absolute positioning, relative positioning, and interrupt feeding | | |
| **Single-axis velocity control** | Velocity control (velocity feeding in Position Control Mode) | | |
| **Single-axis synchronized control** | Cam operation and gear operation | | |
| **Single-axis manual operation** | Jogging | | |
| **Auxiliary function for single-axis control** | Homing, stopping, and override changes | | |
| **External input specifications** | | | |
| **Input voltage** | 20.4 to 28.8 VDC (24 VDC +20%/–15%) | **ON voltage/ON current** | 15 VDC min./3 mA min. |
| **Input current** | 4.6 mA typical (24 VDC) | **OFF voltage/OFF current** | 4.0 VDC max./1 mA max. |
| **ON/OFF response time** | 1 μs max./2 μs max. | | |
| **Internal I/O common processing** | PNP | | |
| **External output specifications** | | | |
| **Rated voltage** | 24 VDC | | |
| **Load voltage range** | 15 to 28.8 VDC | **Residual voltage** | 1.0 V max. |
| **Maximum load current** | 30 mA | **Leakage current** | 0.1 mA max. |
| **ON/OFF response time** | Pulse output: Refer to "*NX-series Position Interface Units User's Manual* (W524-E1)".<br>5 μs max./5 μs max. | | |
| **Internal I/O common processing** | PNP | | |
| **Dimensions** | 12 × 100 × 71 mm (W×H×D) | **Isolation method** | External inputs: Photocoupler isolation<br>External outputs: Digital isolator |
| **Insulation resistance** | 20 MΩ min. between isolated circuits (at 100 VDC) | **Dielectric strength** | 510 VAC between isolated circuits for 1 minute with leakage current of 5 mA max. |
| **I/O power supply source** | Supplied from the NX bus.<br>20.4 to 28.8 VDC<br>(24 VDC +20%/–15%) | **Current capacity of I/O power supply terminals** | IOV: 0.1 A max. per terminal<br>IOG: 0.1 A max. per terminal |
| **NX Unit power consumption** | 0.90 W max. | **Current consumption from I/O power supply** | 20 mA max. |
| **Weight** | 70 g max. | **Cable length** | 3 m max. |

*1. The I/O refreshing method is automatically set according to the connected Communications Coupler Unit and CPU Unit.
*2. These functions are supported when you also use the MC Function Module in the NJ-series CPU Unit.
Refer to the NJ-series CPU Unit Motion Control User's Manual (Cat. No. W507) for details.
A Pulse Output Unit only outputs pulses during the control period based on commands received at a fixed period.
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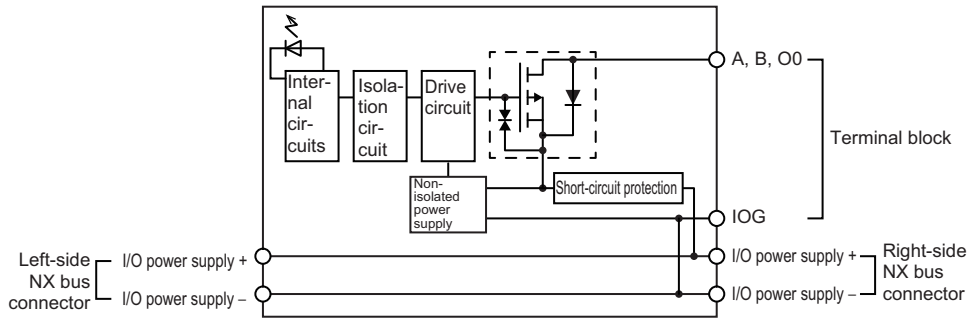
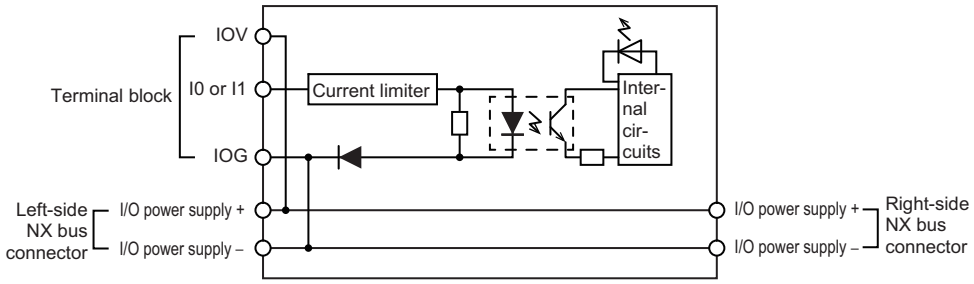
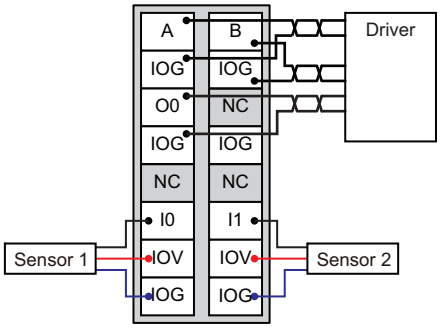
<table>
<tr><td>Circuit layout</td><td>Pulse Output and External Output<br> 

<br>External Inputs<br> 
</td></tr>
<tr><td>Installation orientation and restrictions</td><td>Installation orientation: 6 possible orientations<br>Restrictions: There are no restrictions.</td></tr>
<tr><td>Terminal connection diagram</td><td> 
</td></tr>
<tr><td>Failure detection</td><td>None</td><td>Protection</td><td>None</td></tr>
</table>

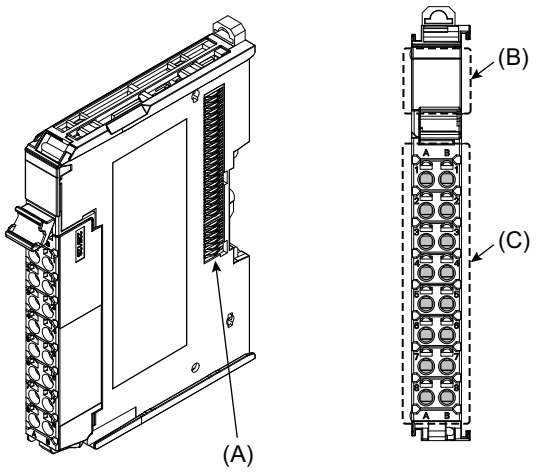
## Version Information

| NX Units | | Corresponding unit versions/versions | | |
|---|---|---|---|---|
| Model | Unit Version | EtherCAT Coupler Units NX-ECC201/ECC202* | NJ-series CPU Units NJ501-□□□□/NJ301-□□□□ | Sysmac Studio |
| NX-PG0112 | Ver.1.1 | Ver.1.0 or later | Ver.1.05 or later | Ver.1.10 or higher |
| NX-PG0122 | Ver.1.0 | | | Ver.1.06 or higher |
| | Ver.1.1 | | | Ver.1.08 or higher |

* For the NX-ECC202, there is no unit version of 1.1 or earlier.

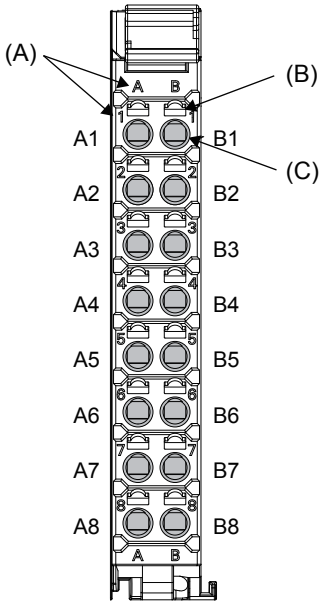
# External Interface

**NX-PG0112/-PG0122**




| Letter | Item | Specification |
|---|---|---|
| (A) | NX bus connector | This connector is used to connect to another Unit. |
| (B) | Indicators | The indicators show the current operating status of the Unit. |
| (C) | Terminal block | The terminal block is used to connect to external devices.<br>The number of terminals depends on the Unit. |

**Terminal Blocks**




12 mm wide
16 terminals

| Letter | Item | Specification |
|---|---|---|
| (A) | Terminal number indication | The terminal number is identified by a column (A and B) and a row (1 through 8). Therefore, terminal numbers are written as a combination of columns and rows, A1 through A8 and B1 through B8.<br>The terminal number indication is the same regardless of the number of terminals on the terminal block, as shown above. |
| (B) | Release hole | A flat-blade screwdriver is inserted here to attach and remove the wiring. |
| (C) | Terminal hole | The wires are inserted into these holes. |

### Applicable Terminal Blocks for Each Unit Model

| Unit model | Terminal Blocks | | | | |
|---|---|---|---|---|---|
| | Model | No. of terminals | Terminal number indications | Ground terminal mark | Terminal current capacity |
| NX-PG0122 | NX-TBA162 | 16 | A/B | None | 10 A |

## Applicable Wires

### Using Ferrules

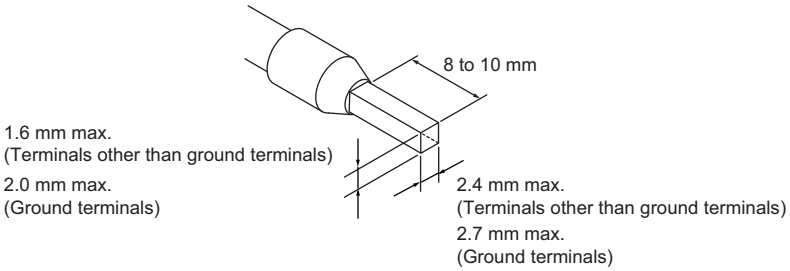
If you use ferrules, attach the twisted wires to them.
Observe the application instructions for your ferrules for the wire stripping length when attaching ferrules.
Always use one-pin ferrules. Do not use two-pin ferrules.

The applicable ferrules, wires, and crimping tool are given in the following table.

| Terminal types | Manufacturer | Ferrule model | Applicable wire ($mm^2$ (AWG)) | Crimping tool |
|---|---|---|---|---|
| Terminals other than ground terminals | Phoenix Contact | AI0,34-8 | 0.34 (#22) | Phoenix Contact (The figure in parentheses is the applicable wire size.)<br>CRIMPFOX 6 (0.25 to 6 $mm^2$, AWG 24 to 10) |
| | | AI0,5-8 | 0.5 (#20) | |
| | | AI0,5-10 | | |
| | | AI0,75-8 | 0.75 (#18) | |
| | | AI0,75-10 | | |
| | | AI1,0-8 | 1.0 (#18) | |
| | | AI1,0-10 | | |
| | | AI1,5-8 | 1.5 (#16) | |
| | | AI1,5-10 | | |
| Ground terminals | | AI2,5-10 | 2.0 *1 | |
| Terminals other than ground terminals | Weidmuller | H0.14/12 | 0.14 (#26) | Weidmueller (The figure in parentheses is the applicable wire size.)<br>PZ6 Roto (0.14 to 6 $mm^2$, AWG 26 to 10) |
| | | H0.25/12 | 0.25 (#24) | |
| | | H0.34/12 | 0.34 (#22) | |
| | | H0.5/14 | 0.5 (#20) | |
| | | H0.5/16 | | |
| | | H0.75/14 | 0.75 (#18) | |
| | | H0.75/16 | | |
| | | H1.0/14 | 1.0 (#18) | |
| | | H1.0/16 | | |
| | | H1.5/14 | 1.5 (#16) | |
| | | H1.5/16 | | |

*1. Some AWG 14 wires exceed 2.0 $mm^2$ and cannot be used in the screwless clamping terminal block.

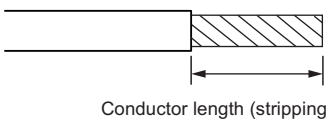
When you use any ferrules other than those in the above table, crimp them to the twisted wires so that the following processed dimensions are achieved.




### Using Twisted Wires/Solid Wires

If you use the twisted wires or the solid wires, the applicable wire range and conductor length (stripping length) are as follows.

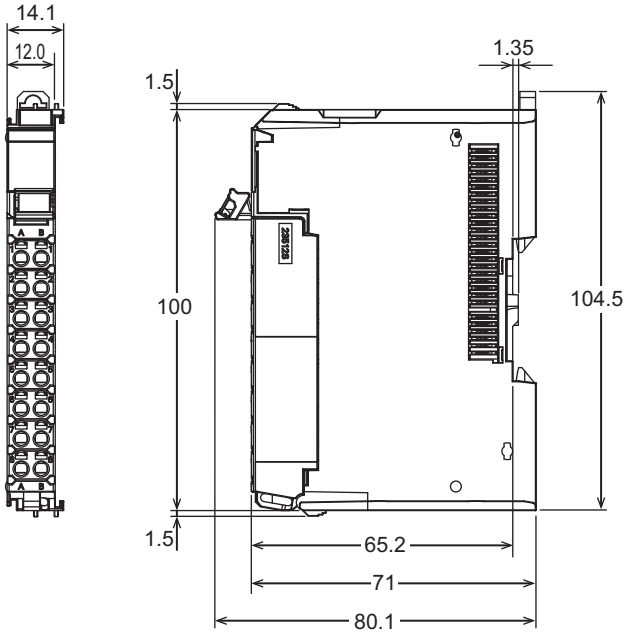
| Terminal types | Applicable wires range | Conductor length (stripping length) |
|---|---|---|
| Ground terminals | 2.0 $mm^2$ | 9 to 10 mm |
| Terminals other than ground terminals | 0.08 to 1.5 $mm^2$<br>AWG28 to 16 | 8 to 10 mm |



## Dimensions

(Unit: mm)

### NX-PG0112/-PG0122




## Related Manuals

| Man. No | Model | Manual | Application | Description |
|---|---|---|---|---|
| W524 | NX-EC0□□□<br>NX-ECS□□□<br>NX-PG0□□□ | NX-series Position Interface Units User's Manual | Learning how to use NX-series Position Interface Units | The hardware, setup methods, and functions of the NX-series Incremental Encoder Input Units, SSI Input Units, and Pulse Output Unit are described. |

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**In the interest of product improvement, specifications are subject to change without notice.**

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